HOW BUILDINGS ARE MADE TO SCRAPE THE SKY

Instead of the Outer Walls Being the Support of the Building They Are Now Merely Hung on the Steel Skeleton, Which Is Put Up to the Roof Sometimes Before the Brick or Stone of the First Story Is In Place.

THIRTEEN years ago there was not a single steel frame building in the world. Today there are thousands of them in America alone.

America has buildings which overtop the mightiest of the pyramids. They range from seven to thirty stories in height. Every city of any size and importance in the United States has them by the score, and others are in the process of erection every day. Even less than a generation ago such structures were undreamed of.

To the most imaginative minds the very thought of running up a building almost as high as the Washington Monument and, most curious of all, starting the brickwork upon the tenth or twentieth floor, was utterly absurd. Our fathers would have scoffed at the very suggestion of such a thing.

The modern steel frame building or skyscraper is essentially a product of the closing decade of the nineteenth century. It is a silent but forcible evidence of Yankee inventive genius, of the rapid strides of progress in the New World. All Europe, backed by the wisdom of centuries of experience, had never dreamed of such a thing until the whole world was set agape by the erection of the first skyscraper in Chicago in 1889. With one stroke the brain and ability of an American had completely overshadowed for all time to come the wonder of the Biblical Tower of Babel. Civilization was compelled to pause a moment in its advance in order to comprehend the new order of things.

Reversed the Order of Things.

It is true that there have been buildings almost as long as there have been men. Every large building that the world has seen for thousands of years was constructed with enormous walls of masonry to bear up the inner framework of partitions and floors. This method of construction was satisfactory and substantial, and there appeared to be no need of changing it. But one day a man with an idea, a daring builder, astonished the world by completely reversing the established order of things, and building an inner framework of steel strong enough to bear the weight of the building and hold up the outside walls of masonry.

This invention—for an invention it certainly was—proved an instantaneous success, with the result that today the construction of a tall building is "not architecture," as one builder remarked, but "engineering with a stone veneer."

"Necessity is the mother of invention." Hence the modern steel frame skyscraper. In every large city there had gradually grown up an omnipresent necessity. It was the need for more room. Great cities had grown up in the United States with a rapidity unknown anywhere in the world; business centers were overcrowded; the predominating factors in the business and professional world were voicing an ever-increasing demand to be within convenient reach of the districts where money was changing hands most rapidly. Every year the necessity became more pressing.

"How are we to gain this necessary space?" asked the property owners "We can't spread out."

"You must go up!" exclaimed the man with the idea.

Single acres of land in the congrested business centers of New York are worth more than $7,000,000. To cover land with even the tallest structures that could be erected in those days was unprofitable in the extreme.

The man with his idea solved the problem. The conclusion was resistless: "We must go up." But how? Again the daring builder offered the solution: "Construct your buildings of steel; they can go as high as you wish."

The value of the idea was instantly recognized. Brain met capital, and the modern skyscraper was evolved—an invention of incalculable value to the busy world of today.

Made Possible by the Elevator.

Steel was rather cheap at that time and engineering as applied to steel construction had been progressing remarkably. Further, the modern elevator had become a reality, thus making the skyscraper possible.

The modern skyscraper is nothing more nor less than a steel bridge standing on end with passenger cars traveling up and down in it. It sounds odd doubtless to call it this, but it is more of a bridge than a building. And the inventor also achieved one of his greatest feats by applying to it a practical railroad system, whose cars traverse vertical tracks at a speed that almost passes belief.

Chicago claims the distinction of possessing the first building erected on the principle of a steel bridge. The Tacoma Building in Chicago and the Tower Building in New York, both of which were completed in 1889, were among the very first buildings constructed along the lines of the steel cage idea. All of these earlier steel frame buildings of great height were run up in the face of tremendous opposition and boundless ridicule. Prophecies were current on almost every tongue that the buildings would prove utter failures. Even experienced builders and the commissioners who issued the permits were skeptical and predicted failure.

Mighty and Difficult Task.

It would be difficult to find a mightier task, one fraught with more difficult problems, than the building of a modern skyscraper. The construction of a railroad line, a great steamship, or a huge steel bridge is not to be compared to it.

Knowing the character of the ground upon which the structure is to stand and how high the building is to go up, the architect must determine how deep down he must go. He must determine upon what the building is to rest. The architect and builder must know, almost to the ton, how much the completed building will weigh, and he must also know the weight of every part of it so that the load may be equally distributed over the framework in order to avoid any tendency to tip over.

The "live" weight which the building is expected to carry must also be computed—the tenants themselves, with their safes, furniture, and other articles. From the character of the soil upon which the building is to rest he must decide just how much weight it will be safe to place on each square foot of ground, whether it will bear one or two tons to the square foot. The exact strain which each girder, each column, even each rivet, will bear must be taken into consideration and computed almost to the pound. The overloading of any single girder endangers the whole structure.

Then the architect must calculate how much wind will blow against his building, and from what direction most of it will come. Precautions must then be taken to strengthen and brace the structure in order to meet any amount of wind coming from the most exposed quarter.

The pounding of the horses' hoofs and the rumble of heavy wagons on the streets outside must be taken into consideration and steps taken to offset the possible damage which might incur from this steady jarring.

Effect of Vibration.

There are many things, exceedingly trifling in themselves, which must be strongly considered in drawing the plans for a skyscraper. Were a man to stand on the ground floor of one of these gigantic structures, particularly at the foot of some open shaft that extended up its entire height, such as an elevator shaft, and play a violin for half an hour every day, the result in the course of ten or twenty years would be far more disastrous than the effects of a man knocking with a sledge hammer upon the steel framework every day for a like period.

This imperceptible sound vibration caused by the violin is one of the most injurious things to be taken into consideration in the erection of the skyscraper. The vibration will in time cause the plaster to crumble and fatally weaken the stoutest of steel frames. The constant rumble and jar from the streets is also highly injurious, as it will in time have a tendency to work rivets loose and unsettle foundations unless precautions are made.

A score of people may stand in one of the rooms of a building and jump up and down upon the floor with all the force they can command, but no harm will result from it. But let one person stand or sit in that room and merely move one leg slightly up and down with a rapid movement, the foot always resting on the floor. At once a jar is created which can be felt all over the room, and which will surely have a bad effect upon the structure if continued for any length of time.

Further, provisions must be made for pumping water to the top stories, usually far above the mark where water can be supplied by the city waterworks. Fires must provided against, and that is one of the most difficult of all problems. All possibility of rust in the steel work must be considered. Proper lighting and ventilation must be assured, so that, if possible, every room has its windows with a street front.

The hampering limits of a city's building laws are also one of the great obstacles in the way of the architect who sets out to design the plans for one of these modern buildings. But these are merely a few of the thousands of intricate details, not to consider the tremendous question of cost, with which the builder must grapple.

And then it often happens that he is blamed and severely criticised if he does not succeed in making this tower of steel, with its vast number of rectangular windows, a thing of architectural grace and beauty.

Rest on Flat Boats.

Securing a solid foundation for one of these modern Towers of Babel is another of the most difficult tasks that has to be encountered by the builder. All of the great buildings of Chicago rest upon what may reasonably be called flatboats.

Chicago is really a floating city—floating on a soft bed of mud and sand. In order to secure a foundation which will safely bear the weight of these large buildings almost more care has to be exercised as to what goes under the ground than what goes above it. Great timbers are driven straight down close together, or else huge steels rails or girders are laid crisscross and filled with cement until they form a huge, solid slab of stone and iron.

Many Leaning Towers.

Frequently, as might reasonably be expected, these flatboats tip slightly to one side or dip on one corner, thus throwing the buildings more or less out of plumb. Many of these modern skyscrapers are out of plumb, like modern Towers of Pisa, although they do not lean enough to be at all dangerous.

Residents of the Windy City will not be likely to forget for many a day the great hubbub that was aroused when a shrewd newspaper man one day made the discovery that one of the most famous skyscrapers in that city, and one of the greatest in the world, was out of plumb.

He was standing in a room on the sixteenth floor of a building across the street. The occupant of the room had fastened a paper weight to the cord of the window shade to keep the curtain down, the spring being out of order. The weight swung clear of the windowsill, thus forming a perfect plumb bob. While standing in the room the newspaper man happened to glance along this cord and across the street to the corner of the mammoth building opposite. He started in surprise. Again he looked across the cord, unable to believe the truth of what he saw. The string was most certainly plumb, else the laws of gravitation were utterly at fault. But the plumb line formed by the window cord and paper weight was correct beyond all question of a doubt; therefore the giant structure was leaning to one side!

He rushed out of the room and got several friends to return with him. They all testified to the same startling fact. Without stopping for further parley, he hastily secured an engineer, and had careful measurements taken. The building was found to lean nine inches to the eastward at the top.

Extensive examinations were made by building experts and engineers, and the conclusion was at length reached that the structure was perfectly safe and that there was not the slightest danger of its going over.

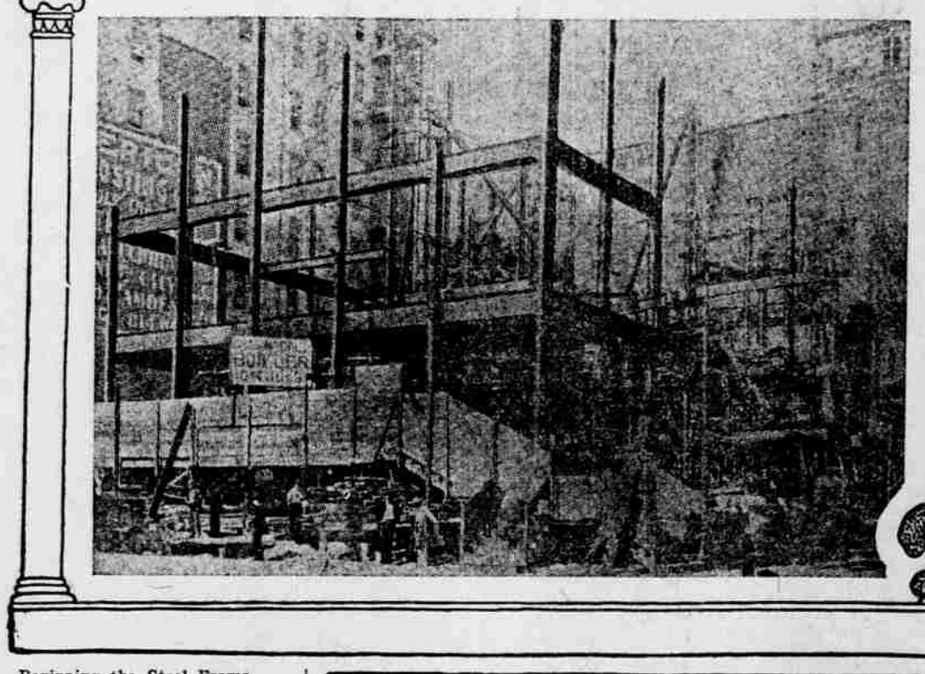
Settle as a Whole.

When these great houses sink or settle they go all in a body. There is no dropping of one corner and consequent twisting of the framework. All this is carefully provided against and the frame is braced accordingly. If there is any settlement the entire building goes together and the structure as a whole is none the worse off for it. The tall buildings of New York, all of which rest on a foundation of solid bed rock or fine wet sand, have settled from one quarter to nine-sixteenths of an inch. The St. Paul Building, New York, and the Marquette Building, in Chicago, have provisions made at the bases of their foundation columns for raising them with powerful hydraulic presses and inserting a packing of steel should they settle too much.

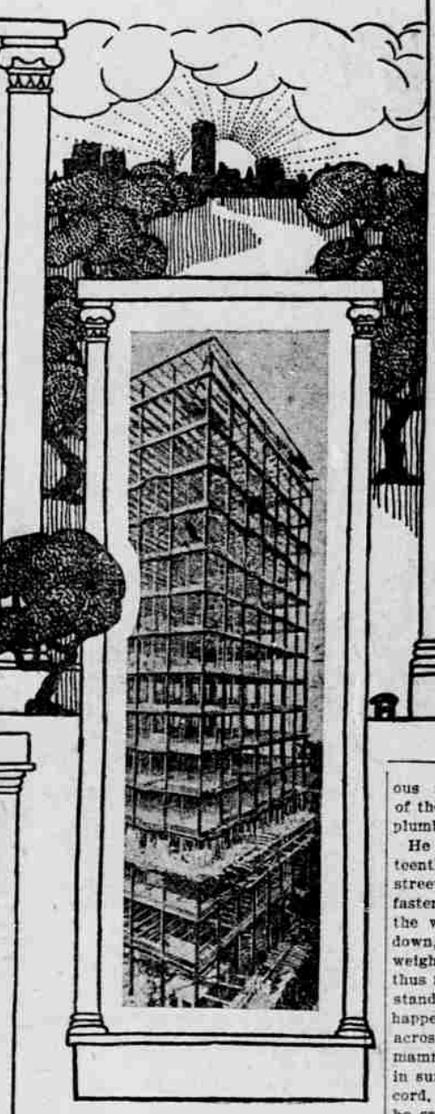
The erection of the big addition to Woodward & Lothrop's department store in this city furnishes a fair idea of how a modern steel frame building is run up. In this case the brick and stone work has begun on the third floor, leaving no masonry on the floors below or above the third. All of the past winter and spring were spent in laying the foundation bedding, upon which rest the huge iron girders for the framework. This bedding was composed of steel girders and solid cement, and extends far down into the ground to insure against any settlement due to lack of a proper bottom.

The tallest inhabited building in the world, and one of the greatest in point of modern furnishings and equipments, is the Park Row Building in New York city. It looms up far above its fellows, and can be seen far out in New Jersey, from Long Island, and from the deck of every ship entering the harbors. It has twenty-nine stories and is 501 feet in height—exceeding by 50 feet the extreme height of the Great Pyramid. The structure weighs about 20,000 tons, and, including its furniture and live weight, its total dead weight probably amounts to 61,400 tons. There are 950 rooms in the building, and its average population is fully 8,000, a number that would do credit to many a flourishing country town. The place is provided with restaurants and handsomely furnished apartments, so that business men may live there the year round, and live comfortably too, without going outside the enormous building.

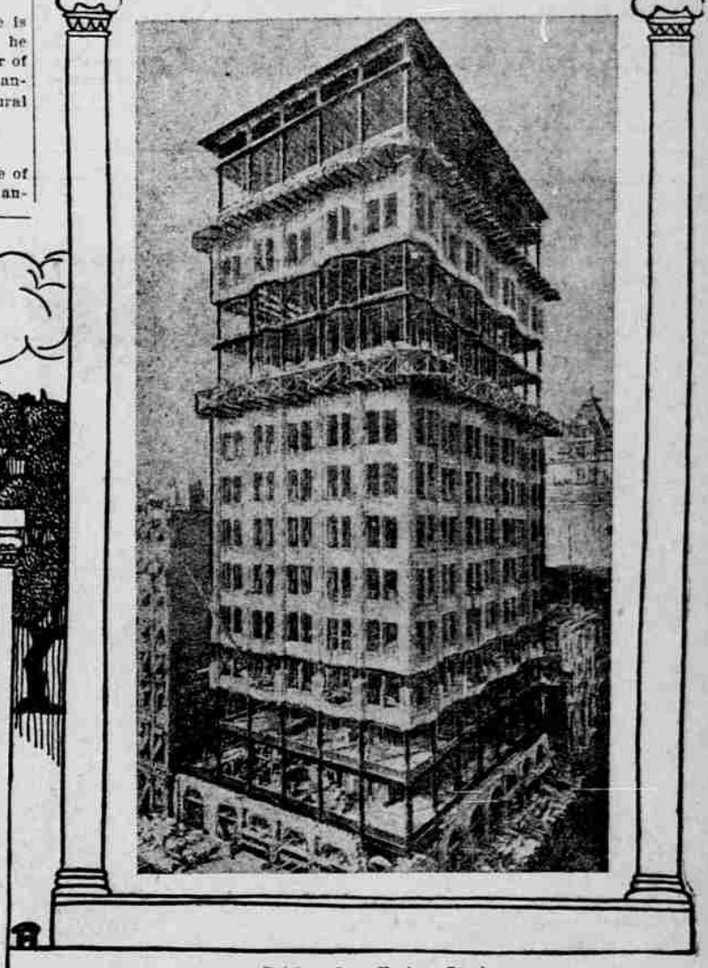
But the American skyscraper is still in its infancy, and, under the continual growth in the demand for land in cities, its future cannot be predicted with any degree of accuracy.



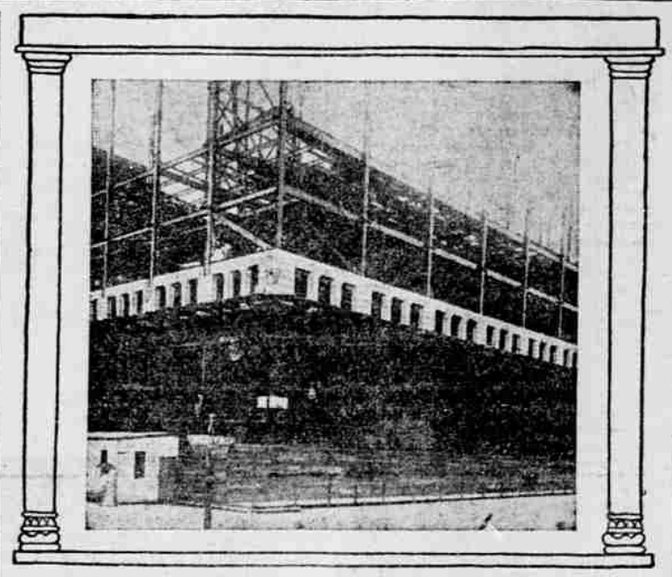
Beginning the Steel Frame.



The Steel Skeleton.



Brickwork at Various Stories.



The Woodward & Lothrop Building, Showing Work on the Walls Begun at the Third Floor.

MEN OF THE WEEK—FIGURES OF PROMINENCE IN THE NEWS OF THE DAY—MAKERS OF HISTORY

(Continued From Second Page.)

From 1894 until December 1900 he was police reporter for the "Journal."

During the campaign of 1900 he espoused the cause of Dr. A. A. Ames, who was elected mayor after a hot campaign. So earnest was he in his efforts for the Ames ticket, that he was rewarded by being appointed private secretary to the mayor. His long experience as a police reporter gave him a good insight into police matters, and the new mayor turned over to him the work of reorganizing the police force. Brown had an intimate acquaintance with the various officers of the department, and when Mayor Ames took his office on January 7, 1901, 105 policemen were discharged. The force was completely reorganized under Brown's suggestions, and the indications were that there would be a successful administration.

Only a few months passed, however, when it was learned that some crooked work was being done by members of the department. Grafters and confidence men were at work in the city, and their victims found that there was no way of getting relief from their depredations. They went to the superintendent of police, Fred W. Ames, brother to Dr. A. A. Ames, mayor of the city, but were told that the police could give them no help.

Matters went from bad to worse, and finally the grand jury undertook to investigate the matter. Two of the confidence men were arrested and convicted. They agreed to testify before the grand jury, and, as a result, one of the greatest plots of municipal corruption ever known in any city was unearthed. Superintendent of Police Ames, several detectives, and others were involved in the deal and indictments returned against them.

The first trial resulted in the conviction of Irwin A. Gardner, a special officer, and he was sentenced to six years in prison. Detective C. C. Norbeck was next tried but ran away when the State had completed its case against him. He was brought back to the city and now languishes in the county jail. Chief of Police Ames was the next one tried but was acquitted. Another indictment was returned against him, but he is now a fugitive from justice, and the boy mayor has placed another man in his position. Indictments are still pending against Mayor Ames, Detectives Morrisey, Howard, Malone, Brackett, Norbeck, Superintendent of Police Ames and Dr. Cohen.

The strain upon the mayor has been so great that he has thought it necessary for him to seek a rest, so he has gone to West Baden Ind., where he is interested in a new hotel. He has secured the position of supervising surgeon of the institution and it is generally believed that he will not return to take up the duties of his office.

When he left the city he gave orders to Secretary Brown to look out for the duties of the office and authorized him in the name of Mayor Ames to do whatever was apparently necessary for the welfare of the city and for the interests of the Ames faction. The rear end of the train which bore Mayor Ames from the city was barely out of sight of the depot before "Tom" Brown was at work planning a complete re-organization of the police department and an effort to lift the soiled and bedraggled skirts of Minneapolis from the dirt and mire into which they had been trailed by Chief Ames and his crowd of detectives.

Brown immediately appointed Capt. C. R. Hill as chief of police and made a general transfer of officers throughout the city, sending those who were thought to be questionable in character and honesty to the resident sections and bringing in those to the business portions of the city whom he knew were honest and upright.

But Brown was not content to rest with a simple reorganization of the department. He issued his orders that all sorts of grafting must be discontinued upon pain of dismissal from the force; that saloons should be closed at the proper time; that no gambling would be tolerated; that houses of assignation should be restricted, and that in every way the laws of the State and the ordinances of the city should be inforced. He called in the various precinct captains and explained to them his policy, and then intimated that if they did not carry out the policy he would find persons who would.

And what is the result? Minneapolis, which a few weeks ago was groaning under the heel of the hydra-headed monster—crime—is now one of the tamest cities in the land, and the disgruntled confidence man, sneak-thief, and grafter has packed his trunk and removed to greener pastures. Saloons are closed on time and all the petty evils that have been such an eye-sore to the proud Minneapolitan have suddenly disappeared from the horizon, while Thomas R. Brown, jr., the boy mayor of Minneapolis, is the recipient of the thanks of the peace-loving citizens of the Flour City.

CHARLES M. SCHWAB.

SCHWAB, STEEL KING, BUILDS A MANSION

CHARLES M. SCHWAB, the man of steel and gold, the modern alchemist who turns everything he touches into the precious metal, is to have one of the most magnificent palaces in the world. This sumptuous residence is to be built at Riverside, overlooking the "lordly Hudson," just a short distance outside New York city.

The term "Napoleon of Finance" was, it is believed, first applied to Jay Gould, and since his time has been used in connection with many men. Some of these have met their Waterloo, so that the designation seems somewhat unlucky; hence it would, perhaps, be unfair to apply it to a man who has made himself so popular as has Mr. Schwab.

The eminent financier is a self-made man. He comes of humble origin, and it is by sheer force of character that he has won his way to the pinnacle in his chosen career. Though a stout man of comfortable appearance, he has no intention, it is said, of "settling down."

Mr. Schwab is of Austrian descent. He began his struggle for existence in the works of Andrew Carnegie. Even in the boy there was that conscientiousness and devotion to business that, advanced from place to place, were manifested all the more plainly by the extension of the field for their exercise. He was successively promoted until he was manager of all the Carnegie interests in America.

It was acting as Andrew Carnegie's representative that he made the arrangements which brought the Carnegie and Morgan interests together and formed the United States Steel Corporation.

Mr. Schwab has a leaning toward horseflesh, and thoroughly appreciates a good animal. He is an expert chauffeur, and made the world's record run from New York to Philadelphia in two hours and a small fraction. He also holds the auto record from Philadelphia to Atlantic City. He is an appreciative patron of the arts.

Mr. Schwab is, at present, president of the United States Steel Corporation, with an enormous salary, and stock which makes him one of the securest capitalists in the country. He is personally extremely popular.

FALSE TAILS FOR TAILLESS HORSES.

"False tails for horses," said a dealer in horse equipments, "are provided for animals that have become what is called rat-tailed. It would be in the case of a fine horse only that such a deficiency would be supplied, for false tails are somewhat expensive.

"The least expensive of them would cost $27.50 and they would run from that up to as high as $50.

"What? Why, certainly. You could buy a whole horse of some sorts for what such a tail would cost, but the cost of these tails is not disproportionate to the value of the horses upon which they are used. These animals are fine, handsome, and valuable carriage horses, lacking only in this feature, useless in their work without it.

"The false tail is attached to the crupper of the harness and is further secured in place by fastenings made fast around the actual tail; it is put on and taken off with the harness. It is worn without the slightest discomfort to the horse, it can't come off, and it is absolutely undistinguishable from a natural tail.

"False tails for horses are made in England, and while in some cases it might be possible to supply demands from tails in stock here, they are commonly made to order, for the individual horses for which they are required. It takes about two months from their receipt to fill orders for false tails.

"The demand for them varies with the fashions in which horses' tails are worn. When horses' tails are worn short there is naturally less demand for false tails than there is when long tails are in fashion.